Packing trees into 1-planar graphs. (English) Zbl 07224275


Summary: We introduce and study the 1-planar packing problem: Given \( k \) graphs with \( n \) vertices \( G_1, \ldots, G_k \), find a 1-planar graph that contains the given graphs as edge-disjoint spanning subgraphs. We mainly focus on the case when each \( G_i \) is a tree and \( k = 3 \). We prove that a triple consisting of three caterpillars or of two caterpillars and a path may not admit a 1-planar packing, while two paths and a special type of caterpillar always have one. We then study 1-planar packings with few crossings and prove that three paths (resp. cycles) admit a 1-planar packing with at most seven (resp. fourteen) crossings. We finally show that a quadruple consisting of three paths and a perfect matching with \( n \geq 12 \) vertices admits a 1-planar packing, while such a packing does not exist if \( n \leq 10 \).

For the entire collection see [Zbl 1435.68040].

MSC:

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